A PROJECT FOR SCHOOLS PUBLISHED BY CADBURY BROTHERS LTD

THIS CLASS LTD.

Manufacturers of

Chocolate Biscuits

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THIS CLASS LTD.
Manufacturers
of Chocolate Biscuits

No. 1. ACROSS THE SEA TO GET SOME WHEAT

Issued by Cadbury Bros. Ltd.
Schools Dept., Bournville

Printed in England by Buckler & Webb Ltd., Birmingham, 3

THIS CLASS LTD.
Manufacturers of Chocolate Biscuits

No. 1. ACROSS THE SEA TO GET SOME WHEAT

Issued by Cadbury Bros. Ltd.
Schools Dept., Bournville

WHEAT

A Staple Food

Wheat can be made into flour. Flour can be made into bread and other foods. Since the earliest days of civilisation wheat has been an important food in countries which have temperate climates. Wheat is a stronger plant than most other cereals and can survive long, dry weather conditions more easily. It thrives in the hard, dry soils of North America, Australia, New Zealand, Europe, Russia and the Argentine.

In this country wheat is mostly grown in the Eastern Counties. Some of the wheat fields in East Anglia are very big—100 acres or more. Most of the wheat grown in this country is sown in the autumn and is called "winter wheat". In many parts of the world the winters are so severe that wheat has to be sown in the spring.

Wheat plays such an important part in feeding the peoples of the world that scientists are constantly experimenting to produce wheat seed which will more easily resist disease and flourish under the most difficult conditions.

A CLOSE LOOK AT THE GRAIN

A single grain of wheat has a deep groove running along its length and at one end there are some tufts of hair. Inside it is rather like an egg. The "shell" is composed of six layers of hard, fibrous skin called the "bran". (*a*) When wheat is milled into flour, the bran is separated and often used to make animal foods. Inside the "bran" is a large area corresponding to the "white" of an egg. This is largely composed of starch and is known as the "endosperm". (*b*) When the endosperm has been separated from the bran it is called semolina—and semolina, after more rolling and sifting becomes white flour. Every wheat grain has a little "yolk" in it. It is called the "germ" (*c*) and contains much of the wheat's food properties—fat and vitamins.

THE HISTORY OF WHEAT

The wheat we grow to-day was developed from wild grasses. They were first cultivated in south eastern Europe and Asia Minor. We know from the Bible how important wheat was in early times. When primitive man began to cultivate wheat, he changed his way of life. Instead of wandering in search of food, he became a community-dweller, living in one place and farming the surrounding land.

The Romans who conquered Britain brought with them new and better kinds of wheat. Many years later, the Pilgrim Fathers and other early settlers in North America took improved wheat seed to their new homeland. They laid the foundations of the immense wheat industry of Canada and America.

The Parable of the Sower tells us how the early farmers used to sow their wheat. Machinery now helps the farmer to sow more accurately and to cultivate and harvest his crop much more quickly.

WHAT DO WE MAKE FROM WHEAT?

It is the miller's job to make flour from the farmer's wheat. He knows the different flours needed for different foods and by skilful blending he produces white and wholemeal flour for bread and cakes, flour for housewives to make into cakes and puddings and pastries, flour to make macaroni and spaghetti —and, of course, flour to make BISCUITS.

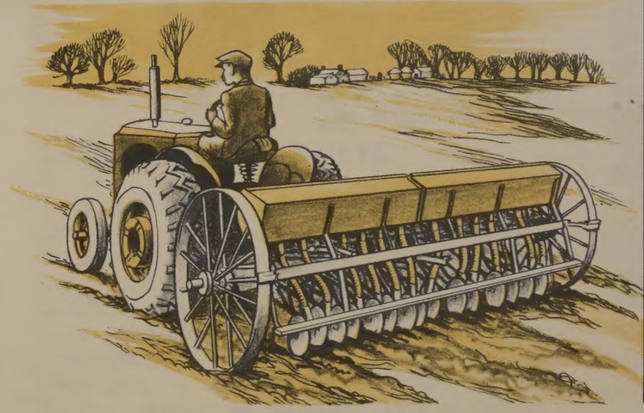
Our flour must give us crisp biscuits with a high food content—this means that it must contain the wheat germ. The best flour for our biscuits will be made from wheat grown in our own country.

WHEAT

Every continent of the world grows wheat. The main wheat-growing areas are usually found in temperate lands, often in the centre of large land masses, where the dry, warm summers ripen the grain. In Britain we shall find the biggest wheat fields in East Anglia. Let us look at a typical farm in Norfolk.

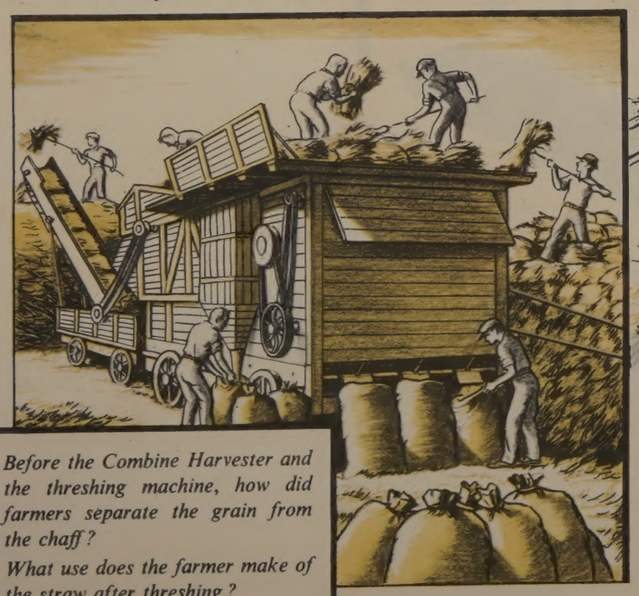
Why do you think that so much English wheat is grown in the eastern counties?

Here is Farmer Crozier. That big level field is part of his farm. Last autumn he planted it with wheat. The machine he uses for sowing the seed is called a drill.



Farmer Crozier uses a Combine Harvester, which cuts the ripe wheat, carries it into the machine, separates the grain from the straw and pours it into sacks. Before he owned a Combine Harvester, Mr. Crozier used a Reaper and Binder which cut and bound the wheat into sheaves. These were stooked in the fields and later built into ricks or barns, ready for threshing.

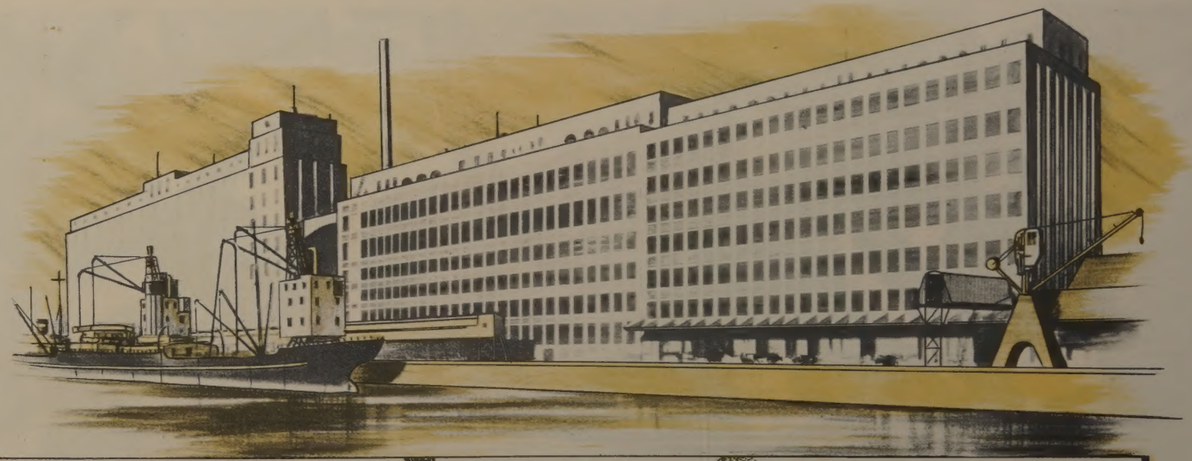
This is a threshing machine. It beats the grain from the ears of wheat. The wheat is pushed head-down into the trapdoor at the top of the threshing box, where rotary arms beat out the grain and fans blow away the chaff. The long straw or wheat stalks are then carried to the other end of the machine and thrown out, to be stacked ready for use on the farm.

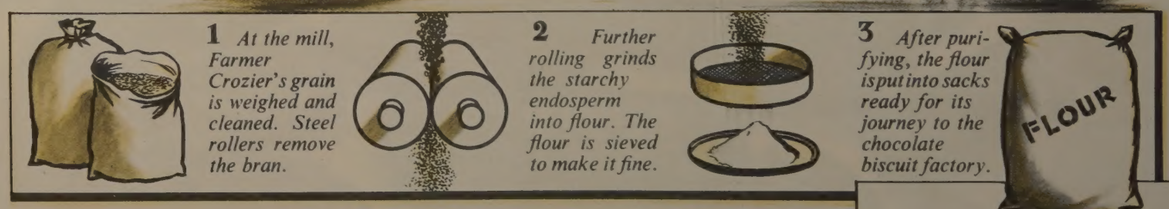


Before the Combine Harvester and the threshing machine, how did farmers separate the grain from the chaff?

What use does the farmer make of the straw after threshing?

This lorry is loaded with sacks of grain from Farmer Crozier's farm. Each sack contains 2 cwt. The lorry is on its way to the local mill, where the grain will be turned into flour.





1 *At the mill, Farmer Crozier's grain is weighed and cleaned. Steel rollers remove the bran.*

2 *Further rolling grinds the starchy endosperm into flour. The flour is sieved to make it fine.*

3 *After purifying, the flour is put into sacks ready for its journey to the chocolate biscuit factory.*

The big mills deal with many tons of wheat every day. It is the miller's job—and a very skilled one—to blend the right types of wheat to produce for us the flour we need to make our biscuits. When the miller has made our biscuit flour, it will travel by road to the chocolate biscuit factory, where it will be made into biscuits of different kinds, ready to be covered with Dairy Milk Chocolate.

Do you know what sort of mills were used to grind wheat into flour before the Industrial Revolution?

Can you suggest two kinds of power which drove these mills?

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No. 2. A-MILKING WE WILL GO

Issued by Cadbury Bros. Ltd.
Schools Dept., Bournville

MILK

NATURE'S PERFECT FOOD

Milk is one of our most important foods. We have it in some form at almost every meal—in the butter we eat with our bread, in cheese, in puddings and custards, and in cups of tea or cocoa. People in Great Britain consume on average ¾ pint of milk every day. As you know, free milk is supplied to schools to help children to grow strong and healthy.

Nature provides milk for young animals because milk is almost a perfect food, containing everything necessary to make young things grow and keep healthy.

In this country when we talk of milk, we usually mean cows' milk, but in some parts of the world people get their milk from other animals. Can you find out how many animals yield milk for man's use, and in which countries they live ?

BRITAIN'S MILK HERDS

Farmers in this country breed cattle for milk and for beef. Famous beef cattle are the Herefords and Aberdeen Angus. Among the most famous dairy breeds are Dairy Shorthorns, Friesians, Jerseys and Ayrshires. Can you name any other breeds of cattle kept in England ?

A good dairy farmer takes great care of his cows, for contented cows give more—and better—milk. A healthy cow may live for as long as twelve years or even more and in this country a cow gives on the average between 600 and 700 gallons of milk a year. Many cows, of course, give more than this and it is not unusual for a champion cow to give, say, 3,000 gallons of milk in a year.

FOODS MADE WITH MILK

Many of the foods we like most are made with milk—butter, cheese, ice-cream and Dairy Milk Chocolate, for instance. Then, of course, milk is also used in cooking. It goes into cakes and puddings. Can you think of any other foods which are made from milk ?

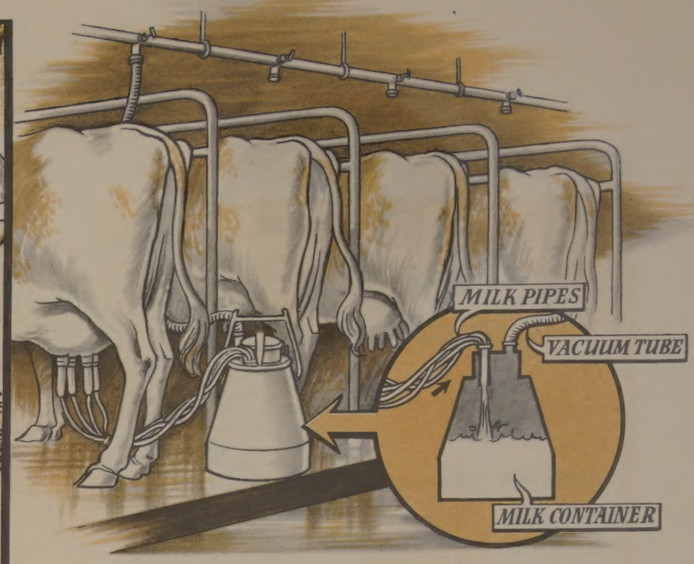
The biscuits which This Class Ltd. are to make will be covered with Dairy Milk Chocolate. We shall need fresh, full-cream milk to make this chocolate. The chief milk producing areas of England are the Midlands and the West Country, where the higher rainfall makes the grass grow faster. We shall visit counties such as Cheshire, Shropshire, Somerset and Devon. Let's take a look at a typical farm.

Here is Mr. Middleton, who will show us round his farm. It is an average size dairy farm of 120 acres. He keeps Ayrshires and cultivates part of his land to provide winter food for his herd. During the summer Mr. Middleton turns his cows into the rich pastures so that they can eat the good young grass. Winter feeding is another matter. Then, the oats he has grown and the hay and silage he has made, together with root crops and special concentrated foods, keep the herd in good condition.

The fields of Mr. Middleton's farm are not all covered with grass. What else does the farmer grow and why? What sort of farming is this called?

The cows are milked twice a day, the first time very early in the morning, which means the farmer has to be up with the lark. Everything in the milking-parlour and dairy is scrupulously clean, all the machinery shining and sterilised and the dairymen wear white overalls. Mr. Middleton knows the importance of keeping milk pure and clean.

What are the important precautions a farmer has to take to ensure clean, wholesome milk?



This is a modern milking-parlour where the milking is done by machinery, but first the cows themselves are washed. The milking machines work by suction, drawing the milk into covered containers. Daily records are kept to show how much milk is given by each cow. Mr. Middleton says he is satisfied with any cow which gives him on average four gallons a day or more. A prizewinning cow will sometimes give more than ten gallons in a day.

Now let's look at the dairy, where we watch the milk trickling over the cooler. This process helps to keep the milk fresh by reducing its temperature. It is always a good idea to keep milk cool because it stays fresher for a longer time at a low temperature. From the cooler the milk passes into clean churns.

Our tour of Mr. Middleton's dairy farm is now over and we must bid him goodbye and follow the churns on their way. It is very important that the milk for our chocolate should be absolutely fresh, so within a few hours of milking it arrives at a Milk Factory. Here it is tested for quality and, if the chemist is satisfied, it will pass into large stainless-steel containers.

This man is mixing measured amounts of milk and sugar before they are condensed in huge vacuum kettles. Condensing means that the water from the milk is driven off, leaving the rich creamy solids which will add all the goodness and flavour of fresh, full-cream milk to the Chocolate.

By condensing the milk in our Factory we can use a lot of liquid milk. How much do you think we shall use to make a pound of chocolate?

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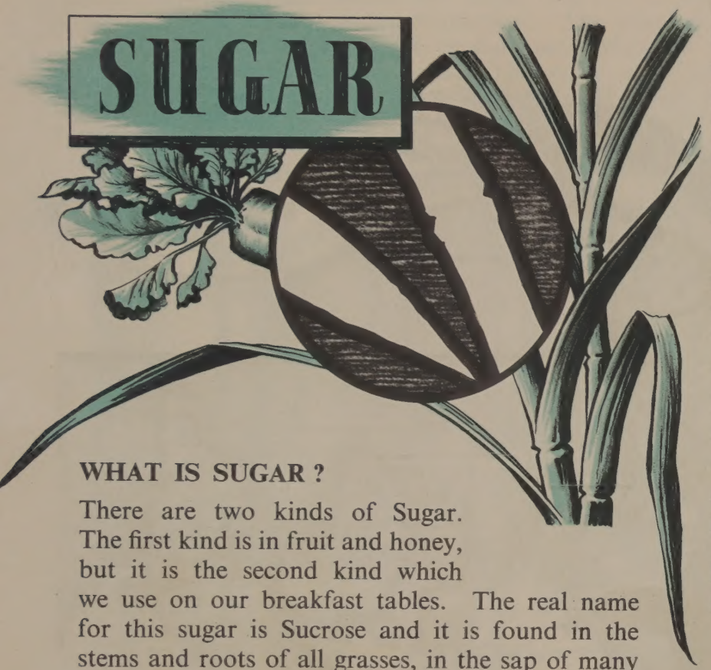
No. 3. PASS THE SUGAR PLEASE

Issued by Cadbury Bros. Ltd.
Schools Dept., Bournville

SUGAR



WHAT IS SUGAR ?

There are two kinds of Sugar. The first kind is in fruit and honey, but it is the second kind which we use on our breakfast tables. The real name for this sugar is Sucrose and it is found in the stems and roots of all grasses, in the sap of many trees and in plants such as the parsnip, the carrot and the beet. Although our sugar is found in so many plants, we obtain it in big quantities from only two plants—Sugar Cane and Sugar Beet.

Sugar Cane is a gigantic grass which is grown in hot countries. It sometimes reaches 15ft. or 20ft. in height. The stalk is about 2in. thick and is jointed in segments like bamboo. The hard rind encloses a soft fibre which contains the sugar.

Sugar Beet is grown in the temperate lands of Europe and North America. The root is white and looks more like a parsnip than a beetroot. We get sugar mostly from the root.

Cane sugar and beet sugar taste exactly alike after the different impurities have been refined away.

HISTORY OF SUGAR

Sugar cane was grown in India 3,000 years ago. It did not take long for other people in South East Asia to discover that they too could grow the cane and enjoy sugar with their food. People in China had a sugar candy as long ago as the 8th century A.D.

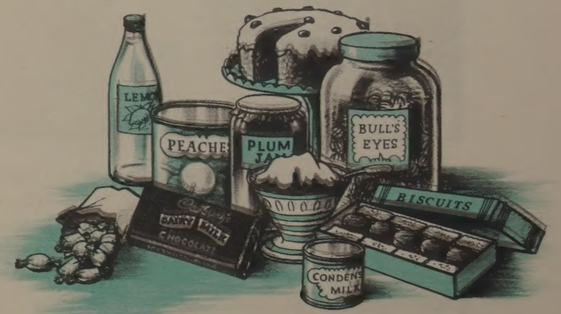
The Crusaders brought many new luxuries to Europe from the East and among them was sugar which they called "Indian Salt" and regarded chiefly as a medicine ! Of course, it was very expensive. We know that 2 lbs. of sugar in those days was worth as much as a pig ! Sugar was so precious that it was used very sparingly. It was generally mixed with spice and sprinkled on food in tiny quantities. Venice was the centre of sugar refining until the 16th century, and sugar was first refined in England in 1544 when Henry VIII was on the throne.

The Spaniards and Portuguese who sailed for the New World during the 16th century planted sugar cane in tropical America. After the sugar-growing regions of the West Indies had become colonies, cane sugar was much cheaper and most European countries began to import more and more.

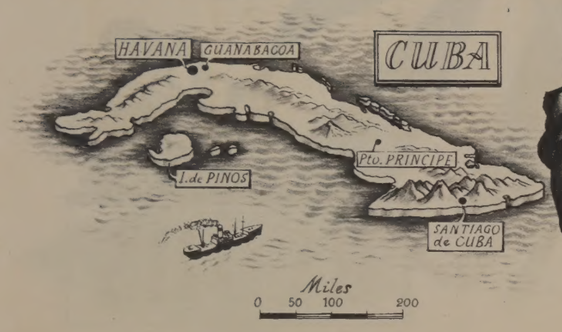
The history of beet sugar probably began with Napoleon ! The British blockade of Europe cut off Napoleon's supply of cane sugar and he forced the French farmers to grow beet for sugar production.

WHAT DO WE MAKE WITH SUGAR ?

The list of things made with sugar is almost endless. Practically everything that is sweet is sweet because it contains sugar—cakes, biscuits, jams, jellies, sweets, chocolate, mineral waters, sauces, ice-cream. In some instances such as jam-making, milk-condensing and fruit-canning, sugar is used because it helps to preserve things. Sugar is an essential, energy-giving food. We shall use plenty of it to sweeten our biscuits and the chocolate which covers them.



SUGAR



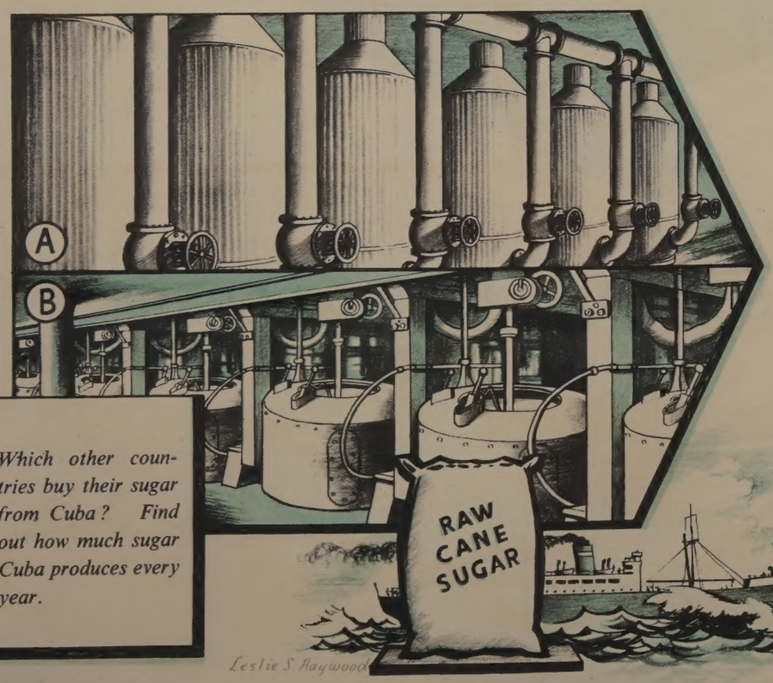
1. The map of the world shows the chief areas for growing sugar cane.

Sugar Cane flourishes in the hot, wet islands of the West Indies and so we will visit one of the largest of them—Cuba. In Cuba we meet the sugar farmer and we watch as he and his men cut down the tall sugar canes. They chop the canes into lengths of about four feet and take them in cage-like carts to the nearby cane-crushing mill.

Sugar cane needs plenty of water. How does the sugar farmer make sure that a regular *supply of water is available?*

2. At the mill, the cane is cut, shredded and crushed by rollers and revolving knives. In this way, the juice is separated from the cane fibre. The fibre is generally used as boiler fuel, coal being very expensive in most cane-producing countries.

3. The sweet juice passes into tanks where it is purified and most of the surplus water evaporates. The juice, now much thicker, is pumped into huge vacuum pans (diagram A) where it is boiled until crystals form. The syrup and crystals are separated in a machine (shown in diagram B) which whirls the mixture around in a perforated container until the syrup is thrown off and the raw cane sugar is left ready to be packed and sent to Britain for refining.



Which other countries buy their sugar from Cuba? Find out how much sugar Cuba produces every year.

SUGAR REFINING

4. "Refining" is the process which gets rid of all the impurities found in raw sugar. Whether the sugar comes from sugar cane or sugar beet the stages of refining are the same. First the raw sugar is washed and the surplus water and syrup are spun off in a similar machine to that we saw in diagram B. The remaining sugar crystals are melted in water and purified. The solution is then filtered by passing over charcoal. Finally the sugar solution, which is now as clear as water, is crystallised in vacuum pans and any remaining syrup spun off. The wet sugar crystals are dried in a current of hot air and so at last from the tall sugar canes of Cuba and the plump sugar beet of Britain we have extracted sparkling white sugar for our chocolate biscuits.

BRITISH SUGAR BEET

Most English sugar beet is grown in East Anglia and the Midlands.

At the autumn harvest, a machine like a plough "lifts" the beet from the soil, cutting off the long thin root. After the green tops have been removed, the beets go to the nearest refinery to be washed and cut into slices from which raw sugar is extracted for refining.

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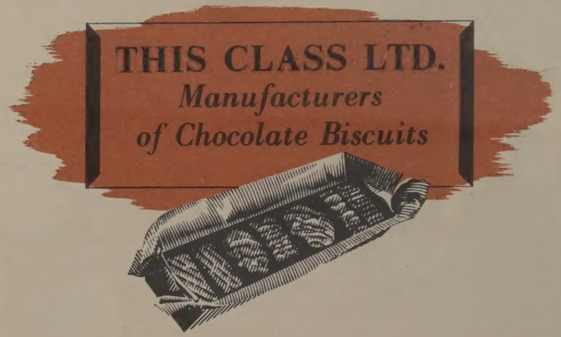

No. 4. 4,000 MILES FOR COCOA BEANS

Issued by Cadbury Bros. Ltd.
Schools Dept., Bournville

COCOA BEANS

FOOD OF THE GODS

Four centuries ago, Cocoa beans were known only to the Aztecs of Mexico and the Incas of Peru. To these people of Central and South America the cocoa beans were precious as food and coins. By roasting the beans and adding spices, the Aztecs made a frothy beverage which they liked so well that they believed it must be the food of the gods in Paradise. Cocoa beans were used in these ancient civilisations as money, and land, animals and slaves were bought with them.

CORTEZ AND MONTEZUMA

In 1494 when Columbus returned home to Spain from South America, he took with him a store of discoveries. Amongst his treasures were some cocoa beans, but Columbus did not realise their value. Twenty years later, Cortez the Spanish adventurer, was received at the Palace of Montezuma the Aztec Emperor and discovered the secret of making cocoa beans into a delicious drink. For nearly a hundred years the secret was jealously guarded in Spain, but at last it was introduced to France and later brought to England where it became the fashionable drink of the 17th century.

HOW COCOA CAME TO AFRICA

In 1879 a Blacksmith named Tetti Quesi travelling to West Africa took with him cocoa beans from South America and planted them as an experiment. The cocoa trees grew and flourished. The hot, wet, forest areas lying between the tropics of Cancer and Capricorn are ideal for cocoa cultivation, and today nearly half of the world's supply of cocoa beans is grown in the British West African colonies of the Gold Coast and Nigeria.

THE WORLD'S COCOA GROWING AREAS

Cocoa can be grown only in those countries which lie between the tropics of Cancer and Capricorn, where the hot, wet climate gives ideal conditions. Much of the world's cocoa comes from the Gold Coast and Nigeria, but cocoa is also cultivated in French West Africa, Brazil, Venezuela, Ecuador, San Domingo, Trinidad and other West Indian islands. Experiments have recently been made in growing this important food in Malaya and now, so popular are chocolate and chocolate products in every part of the world that an increase in the total production of cocoa is urgently needed.

WHAT DO WE MAKE WITH COCOA BEANS ?

Cocoa beans are used to make Cocoa and Chocolate, of course, but there are useful by-products such as cocoa butter. Cocoa shell is quite a valuable cattle food. Most of the chocolate and chocolate drinks we buy in this country are made from cocoa beans which have travelled 4,000 miles from West Africa. Many sweets and foods are covered today with good chocolate because we have learned that chocolate is not only delicious—it really is a food which is very good for us and doctors recommend it. That is why we shall use rich Dairy Milk Chocolate to cover the Chocolate Biscuits which we are to make.

COCOA BEANS

If we are to see cocoa harvested, we shall need to travel by steamer or 'plane to the Gold Coast in West Africa. Here the African farmers cultivate the cocoa trees and harvest the wonderful pod which contains 20 or 30 beans.

The cocoa farmer makes his living from cocoa, but do you know what his other crops are? Why does the farmer grow these other crops?

The main cocoa harvest takes place in October. Here is Kweku, a good cocoa farmer, cutting down his ripe pods with the long curved knife which he calls a cutlass. His family and friends will follow behind him to gather the fallen pods. In a good year each cocoa tree will yield 25 pods—enough to make one pound of Bournville Cocoa.

When the cocoa pods are gathered, they are piled in a heap. The older men usually split open the pods and the women and children scoop out the creamy white beans, which are covered in a sticky pulp. Next the beans are taken away to ferment.

The Gold Coast farmer ferments his beans in the heat of the forest. He packs them together on plantain leaves, covers them with more leaves, and lets the pile stand for about a week. At the end of this time the beans are brown in colour, and the pulp has melted away. Fermenting helps to improve the taste of the beans.

What other duties do you think Kweku's wife has to do besides helping with the cocoa? What sort of schools do you think his children attend?

After fermenting, the beans need to be well dried and are spread on long tables in the hot sun. Each day Kweku and his family patiently turn over the beans, throwing out those which are not of the best quality. When Kweku is satisfied that the beans are ready for market, his helpers fill them into sacks.

The man at the scales is a Cocoa Broker and he will pay Kweku for the cocoa beans according to their quality. We can pay the broker to buy our beans for us. Kweku is a good farmer and therefore will earn a good price for his beans. The broker who has bought the beans from Kweku will now send them to the coast where steamers are waiting to transport them to England.

Can you draw a map of the route of the Cocoa beans from the Gold Coast to England? To which ports do they come?

Now our beans have reached the sea at Accra. There is a more modern harbour on the Gold Coast at Takoradi and another is being built at Tema, but at Accra and many other ports the shallow waters make it impossible for big steamers to come close inshore. Strong Africans must load the precious cocoa cargo into surf boats and battle their way half-a-mile through the breakers. The waiting steamers will then take our cocoa beans 4,000 miles across the sea to our Chocolate Biscuit Factory in England where we shall use them to make the rich Dairy Milk Chocolate covering for our chocolate biscuits.

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No. 5. AT THE CHOCOLATE BISCUIT FACTORY

Issued by Cadbury Bros. Ltd.
Schools Dept., Bournville

At the

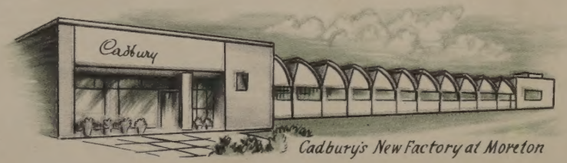
CHOCOLATE BISCUIT FACTORY

WE HAVE BOUGHT OUR RAW MATERIALS

This Class Ltd. has set out to make chocolate biscuits. In the other four folders we have seen how our raw materials are made ready for us to use—wheat for our flour, from East Anglia, milk from British dairy herds, sugar from West Indian sugar cane and British sugar beet, and cocoa from West Africa. But, in order to make our chocolate biscuits, there is something else we need. We need a **Chocolate Biscuit Factory.**

WHAT SHOULD OUR FACTORY LOOK LIKE ?

Our factory will be a **food** factory. Like all food factories, it should be clean and light. Over the page we shall see how chocolate biscuits are made on long moving belts that carry the biscuits through the ovens, the coolers, the chocolate covering machines and the wrapping machines. The great length of this process (it might be as long as an ocean liner) will probably mean that our factory will be a long building with plenty of window space to let in as much sunlight and fresh air as possible. At one end of the factory, where the biscuit-making process begins, we shall need a "receiving deck" where lorries or trains can unload our flour, milk, sugar and cocoa. From the same place, the finished packets of chocolate biscuits can be sent, by road or rail, to the shops.



Cadbury's New Factory at Moreton

Inside our factory everything must be kept spotlessly clean, no dust-collecting cracks or crevices.

The ideal chocolate biscuit factory needs a "garden"—a fresh, green, growing surround of lawns, trees and flowers.

A "Factory in a Garden" like this will be a pleasant place to work in.

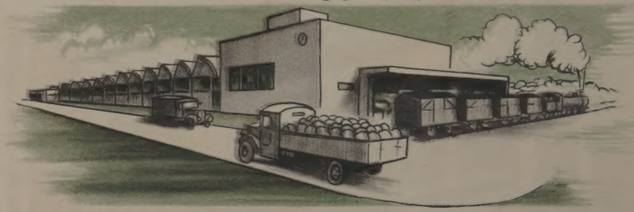
All this reminds us that when we are planning our factory we must not forget the men and women who will have to work there. We must build canteens for those who cannot travel home for meals and a surgery with a trained medical staff. In the garden around the factory we must leave space for tennis, football, cricket, hockey and other sports for our employees to enjoy.

WHERE SHOULD OUR FACTORY BE ?

If the air in and around our factory is to be really **fresh** we must build away from the smoke and the dust of neighbouring industries. Cadbury's chocolate biscuit factory, for instance, is built a stone's throw from the Irish Sea at Moreton, in Cheshire. The winds that freshen it come from the Welsh mountains and the sea.

Good roads and railways are essential too. We must build close to both, so that our ingredients can be brought in easily and quickly and our finished goods taken, without delay, to shops in every part of the country. If we are going to **export** some of our biscuits, it will be an added advantage to be near a large port.

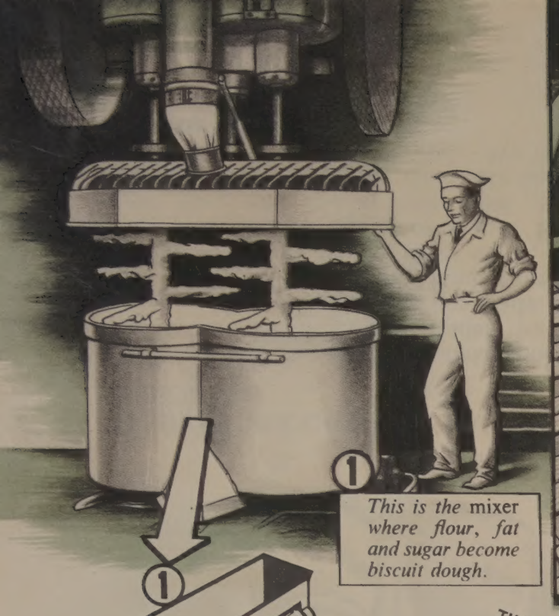
We must not forget that we shall want a lot of people to work in our factory. They will not want to make a long journey to work every



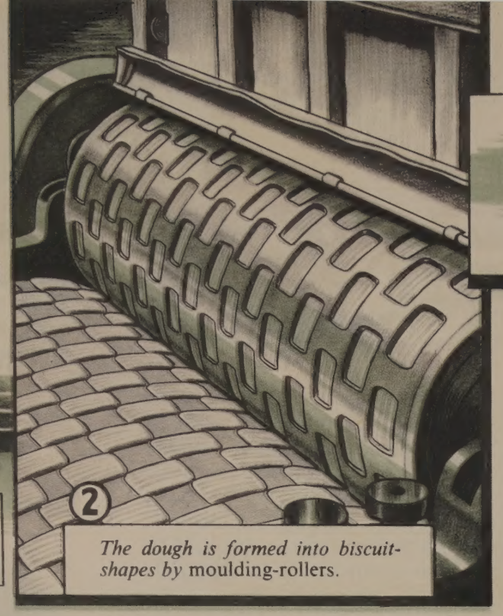
day. We must be reasonably close to their homes —perhaps in a small town or suburb of a city.

And now our adventure is nearly over. We have travelled thousands of miles to buy our raw materials. We have designed our factory and chosen a site for it. We employ our workers. And now, perhaps, comes the most exciting part of all—open up this folder to see **how** we make our chocolate biscuits !

At the CHOCOLATE BISCUIT FACTORY

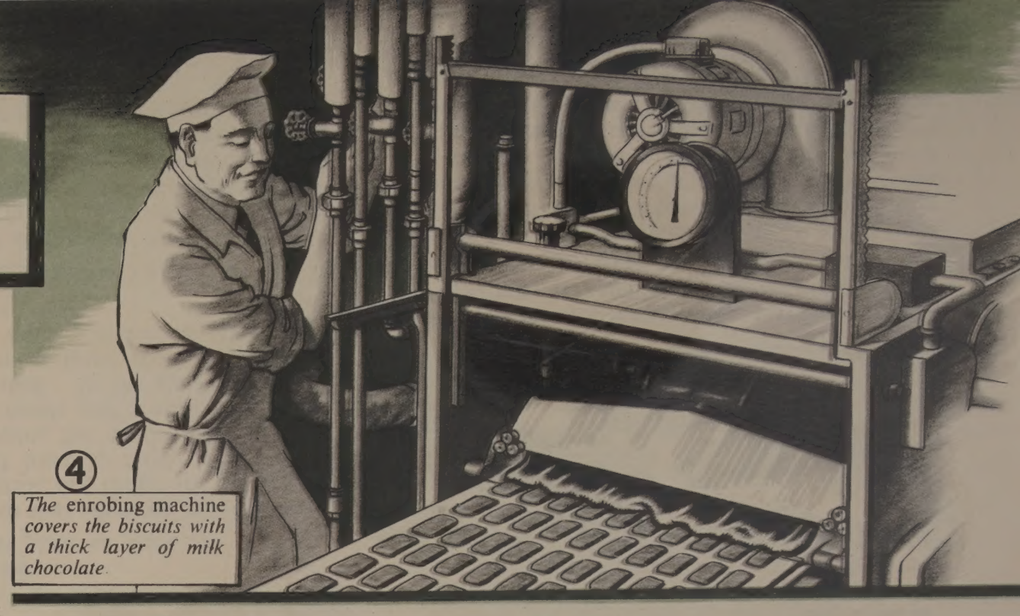


① *This is the* mixer *where flour, fat and sugar become biscuit dough.*

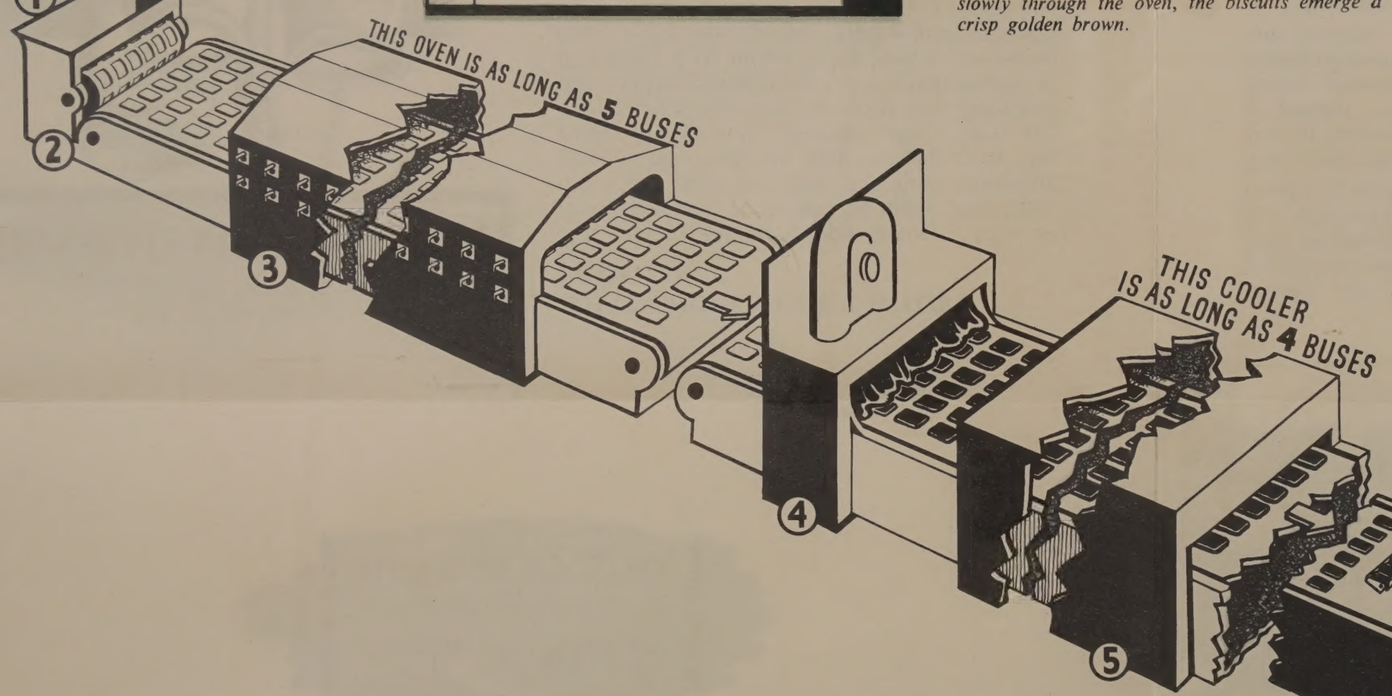


② *The dough is formed into biscuit-shapes by* moulding-rollers.

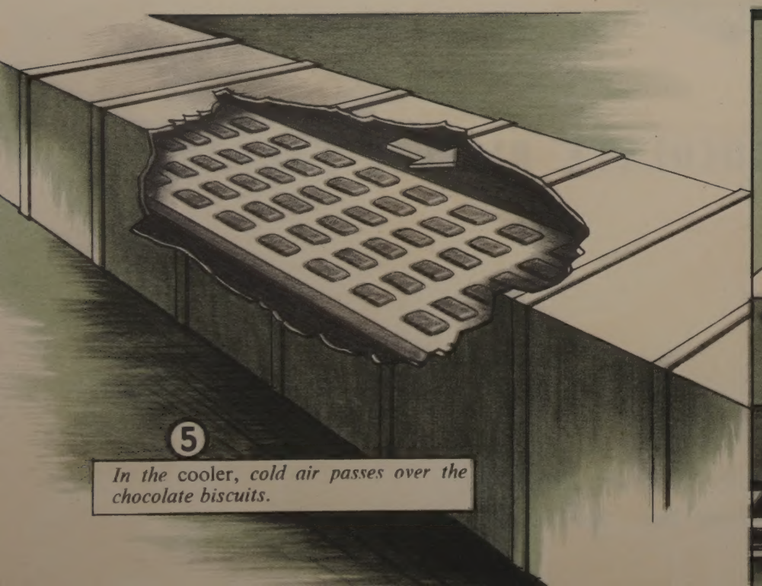
③ *The biscuits are baked in the long* oven, *which is heated by hundreds of gas burners. After moving slowly through the oven, the biscuits emerge a crisp golden brown.*



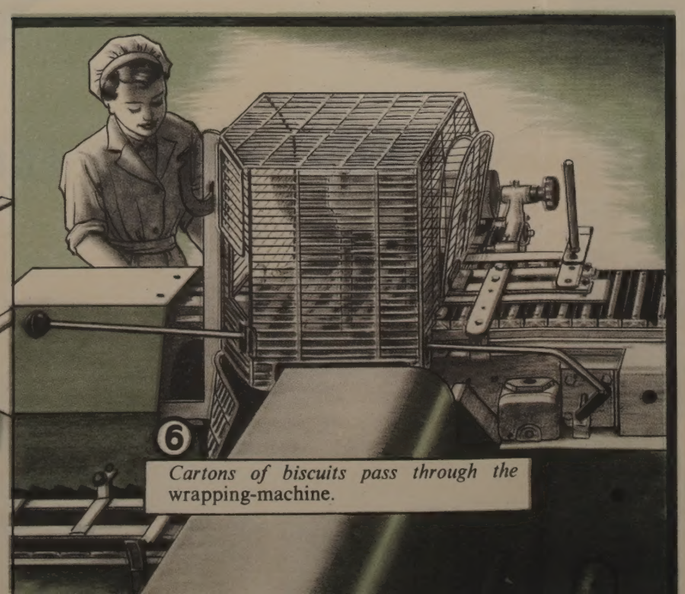
④ *The* enrobing machine *covers the biscuits with a thick layer of milk chocolate*



If our chocolate biscuits are popular and lots of people want to buy them we shall probably need several complete production units such as this.



⑤ *In the* cooler, *cold air passes over the chocolate biscuits.*



⑥ *Cartons of biscuits pass through the* wrapping-machine.

Leslie S. Haywood.

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THE FIVE FOLDERS in this wallet have been designed as a guide to group work. Each group will bring its own contribution to the making of "This Class Ltd." Chocolate Biscuits by buying the four main ingredients or supervising the manufacturing processes at the factory.

Teachers may, of course, be able to use some of the folders in other geography schemes.

No. 1. ACROSS THE SEA TO GET SOME WHEAT

Man's use of grain from Biblical times — Wheat growing areas of the world — Wheat cultivation — Flour milling.

No. 2. A-MILKING WE WILL GO

Milk as an important food — Dairy farming in England — Processing of fresh milk for chocolate.

No. 3. PASS THE SUGAR PLEASE

How sugar came to Europe — Cane sugar from Cuba — Beet sugar grown in England — Sugar refining.

No. 4. 4,000 MILES FOR COCOA BEANS

How cocoa was discovered in South America — Cocoa growing in the Gold Coast — Shipping cocoa beans to Britain for chocolate making.

No. 5. AT THE CHOCOLATE BISCUIT FACTORY

What a factory site needs — Cleanliness of a food factory — How the chocolate biscuits are made, using flour, sugar, milk and chocolate.

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